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Development of the Exercise Motives and Gains Inventory

Abstract

There are existing measures of exercise motives (what people want from exercise), but corresponding measures of gains (what people get) are needed, because motives and gains could influence each other and together influence other variables. An Exercise Motives and Gains Inventory (EMGI) was developed by creating gains scales to complement existing Exercise Motivations Inventory 2 scales. Confirmatory factor analyses of EMGI items established that items reflected their intended constructs; and that motive and gain constructs were distinct. Exploratory structural equation modeling of EMGI scales established that the higher-order structures of motives and gains were somewhat different: appearance motive was associated with weight management, whereas appearance gain was associated with health and fitness. Paired-sample t-tests established that gains were less than motives in some instances (ill-health avoidance, positive health), and greater in others (e.g., affiliation, challenge). The EMGI can be used to investigate the consequences and causes of motives and gains.

Keywords. Exercise motivation. Motives. Gains. Questionnaire. Psychometric analysis.

Introduction

Aim

Participatory motives are what individuals seek to attain or avoid by engaging in a particular domain of behavior. The study of such motives has become an important cornerstone of exercise participation research (Ingledew & Markland, 2008). However, whereas motives have received ample attention, gains have not. By gains, we mean what people have attained or avoided through engagement. Arguably, motives (what people want) and gains (what they get) should be studied in parallel, because they are likely to influence each other and jointly influence exercise-related processes and outcomes such as behavioral regulation, exercise amount, satisfaction, and intention. The aim of the present study was to develop a measure of motives and gains by adding gains scales to an existing measure of motives, the Exercise Motivations Inventory version 2 (EMI-2: Markland & Ingledew, 1997). We first review the EMI-2.

The EMI-2

Various instruments exist to assess individuals' motives for exercising. These include the Reasons for Exercise Inventory (REI: Silberstein, Striegel-Moore, Timko, & Rodin, 1988), the Personal Incentives for Exercise Questionnaire (PIEQ: Duda & Tappe, 1989), the Revised Motivation for Physical Activity Measure (MPAM-R: Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997), and the Goal Content for Exercise Questionnaire (GCEQ: Sebire, Standage, & Vansteenkiste, 2008), as well as the EMI-2 (Markland & Ingledew, 1997). As is apparent from the names of these instruments, some researchers prefer other terms to describe motives, such as “reasons” (Silberstein et al., 1988) or “goal contents” (Sebire et al., 2008).

The EMI-2 is a flexible instrument. It comprises 14 scales: Affiliation, Appearance, Challenge, Competition, Enjoyment, Health Pressures, Ill-Health Avoidance, Nimbleness, Positive Health, Revitalization, Social Recognition, Strength and Endurance, Stress

Management, and Weight Management. In comparison, other measures outlined above comprise between five (e.g., MPAM-R) and nine (PIEQ) scales. Some researchers appreciate the EMI-2's wide coverage of motives (Kilpatrick, Hebert, & Bartholomew, 2005; Maltby & Day, 2001; Shen & Xu, 2008). However, if circumstances require, the 14 scales can be aggregated into superscales, for example, by combining appearance and weight, or health and fitness-related scales (Ingledew & Markland, 2008; Ingledew, Markland, & Ferguson, 2009; Shen & Xu, 2008). The EMI-2 can be used with current nonexercisers as well as exercisers, because the item stem and wording were designed to make this possible. It has performed well in confirmatory factor analysis (Markland & Ingledew, 1997) and partial least square analysis (Ingledew et al., 2009), with items reflecting their intended constructs and constructs being discriminated from each other. With only minor occasional exceptions, internal consistencies of scales (Cronbach's alpha) have been high (> .70) (e.g., Egli, Bland, Melton, & Czech, 2011; Funk, Jordan, Ridinger, & Kaplanidou, 2011; Grogan, Conner, & Smithson, 2006; Ingledew, Markland, & Medley, 1998; Ingledew & Sullivan, 2002; Kulavic, Hultquist, & McLester, 2013; Maltby & Day, 2001; Quindry, Yount, O'Bryant, & Rudisill, 2011; Shen & Xu, 2008; Zajac & Schier, 2011).

The EMI-2 has demonstrated usefulness in identifying various determinants of exercise motives. Motives have been found to differ by age (Dacey, Baltzell, & Zaichkowsky, 2008; Ingledew & Sullivan, 2002; Quindry et al., 2011); for example, appearance and stress management being lower in older than in not so old adults (Dacey et al., 2008). Traditional students (full-time, 18-22 years old, living on campus) compared with nontraditional students were more motivated by challenge, social recognition, affiliation, competition, appearance and nimbleness, and less by health pressure and ill-health avoidance (Kulavic, Hultquist, & McLester, 2013). Sex differences have been found (Dacey et al., 2008; Egli et al., 2011; Grogan et al., 2006; Ingledew & Sullivan, 2002; Kilpatrick et al.,

2005; Quindry et al., 2011; Shen & Xu, 2008); for example, adolescent females compared with males having higher weight management and lower strength and endurance motives (Ingledew & Sullivan, 2002). Differences by sexual orientation have also been found; for example gay men compared with heterosexual men having higher appearance and lower enjoyment and competition motives (Grogan et al., 2006). Ethnic differences (Egli et al., 2011; Zajac & Schier, 2011) have also been found; for example, Black compared with White students being more motivated by health pressures, ill-health avoidance, and nimbleness, and less by stress management, revitalization, enjoyment, and weight management (Egli et al., 2011). Body image has predicted motives (Ingledew & Sullivan, 2002; Zajac & Schier, 2011) differently in males and females. Personality traits have predicted motives; for example openness positively predicting health/fitness motives and neuroticism positively predicting appearance/weight motives (Ingledew & Markland, 2008). Life goals (what individuals generally aim to attain or avoid in life) have also predicted motives; for example image life goal predicting appearance/weight motives (Ingledew et al., 2009).

The EMI-2 has also demonstrated usefulness in identifying various consequences of exercise motives. Motives have been associated with psychological well-being; for example appearance motive being associated with poorer well-being in pre-maintenance exercisers (Maltby & Day, 2001). Motives have predicted behavioral regulation (Ingledew & Markland, 2008; Ingledew et al., 2009); for example, appearance/weight and social recognition predicting external regulation (control by external contingencies), appearance/weight also predicting introjected regulation (control by internalized contingencies), stress management and health/fitness predicting identified regulation (conscious valuing), and affiliation and challenge predicting intrinsic regulation (enjoyment) (Ingledew et al., 2009). Through behavioral regulation, motives have predicted amount of exercise participation (Ingledew & Markland, 2008; Ingledew et al., 2009); for example, stress management, health and fitness,

affiliation, and challenge positively predicting participation (Ingledew et al., 2009). Motives have also been associated with stage of change (Dacey et al., 2008; Ingledew et al., 1998); for example appearance and weight motives being prominent in early stages but enjoyment and revitalization motives being conducive to maintenance (Ingledew et al., 1998), with commitment and intention to continue exercising (Funk et al., 2011), and with adherence to an exercise program (Izquierdo-Porrera, Powell, Reiner, & Fontaine, 2002). Finally, motives have been shown to be associated with type of activity (Kilpatrick et al., 2005; Zajac & Schier, 2011); for example, aerobics compared with yoga participants manifesting higher weight management and lower positive health and stress management motives (Zajac & Schier, 2011).

According to Markland and Ingledew (2007), many of these findings can be interpreted in terms of self-determination theory (Ryan & Deci, 2000). From this theoretical perspective, motives lead to autonomous regulation depending upon their potential to satisfy basic needs for autonomy, competence and relatedness (Vansteenkiste, Lens, & Deci, 2006). Ingledew et al.'s (2009) three-level model of motivation (life goals leading to exercise motives, leading to behavioral regulation and thereby behavior) is consistent with this theory, although these authors did not measure need satisfaction. However, use of the EMI-2 is not limited to this particular theory and has been used with reference to other frameworks such as Leary and Kowalski's (1990) model of impression management (Strong, Martin, Ginis, Mack, & Wilson, 2006). It has also been used in studies without reference to any specific theoretical frameworks (Grogan et al., 2006; Halliwell, Ditmar, & Osborn, 2007; Izquierdo-Porrera et al., 2002; Kulavic, Hultquist, & McLester, 2013). All in all, if validity is the "degree to which scores on an appropriately administered instrument support inferences about variation in the characteristic that the instrument was developed to measure" (Cizek, 2012), then the cumulative evidence supports the use of the EMI-2 as a measure of exercise motives.

Need for an Exercise Motives and Gains Inventory

Whereas motives are what people *seek* to attain or avoid through engagement, gains are what they *have* attained or avoided through engagement. Such a distinction can be found in the research into volunteering behavior where Clary et al. (1998) have studied motives and "functionally relevant benefits" (what we would call gains). Both motives and gains refer in some way to the content (the "what") of behavioral goals (such as engaging in exercise). However, motives are reasons *to* engage whereas gains are results *from* having engaged. Motives and gains are distinct from goal features such as importance, difficulty or specificity (see Austin & Vancouver, 1996). For example, two individuals may place the same importance on a behavioral goal, but have different motives for pursuing it and experience different gains from achieving it. When people's gains correspond to their original motives, we would call this motive fulfillment. For example, a person may take up a martial art solely to develop new skills (challenge motive) and find that they do indeed develop such skills (challenge gain). However, unsought gains may occur. For example, the same person may incidentally find that they make new friends and come to appreciate this social gain.

A distinction can be made between subjective and objective gains. A subjective gain is the person's own perception that they have gained something through participation, e.g., “I have acquired new skills though this martial art”. An objective gain, in contrast, is an external observer's assessment that the person has gained something through participation, e.g., "The individual has scored well on this grading of skill”. The present study focuses only on subjective gains, measured by self-report. As in research into volunteering (Clary et al., 1998; Davis, Hall and Meyer, 2003), there will be one set of scales measuring motives and a separate set of scales measuring gains. Each motive and each gain scale would be expected to be homogeneous (unidimensional), but each motive scale would be expected to be distinct from its corresponding gain scale (separate dimensions). The higher order structure of

motives would be expected to be similar to that previously suggested by Ingledew and Markland (2008; see also Ingledew, Markland, & Ferguson, 2009). However, the higher order structure of gains might differ from the higher order structure of motives. This is because, in the translation of motives into gains, there will be perturbations arising from, for example, unsought gains.

There are four good reasons for creating a measure that allows one to examine exercise gains alongside motives. First, individuals with a particular motive may be more likely to make a corresponding gain, and individuals experiencing a particular gain may be more likely to develop a corresponding motive. This would manifest as a positive association between motive and corresponding gain. Such positive associations have been found in research into volunteering with charity organisations and other prosocial behavior such as organisational citizenship behaviour (Davis, Hall, & Meyer, 2003; Finkelstein, 2006, 2008). Second, some motives may be easier or harder than others to convert into corresponding gains (harder to attain or to perceive). This would manifest as a within person mean difference between motive and corresponding gain. To our knowledge, such motive-gain mean differences have not been examined in any literature. Third, individuals with a particular motive may experience different outcomes (such as level of satisfaction) depending on whether they make a corresponding gain. This would manifest as an interactive effect of motive and corresponding gain. Such interactive effects have been found in research into volunteering (Clary et al., 1998). Fourth, even if exercise gains do not moderate the effects of motives, they could have effects in their own right. This would manifest as an additive effect of motive and corresponding gain. Such additive effects have been found in research into volunteering and other prosocial behavior (e.g., Davis et al., 2003; Finkelstein, 2006, 2007).

Present Study

The aim of the present study was to develop a measure of motives and gains by adding gains scales to the Exercise Motivations Inventory version 2 (EMI-2: Markland & Ingledew, 1997). The resulting composite measure would be known as the Exercise Motives and Gains Inventory (EMGI). The objectives were to assess the lower-order structure (factor analysis of items) and the higher-order structure (factor analysis of scales), and to examine discrepancies between motives and corresponding gains (within-person gain-motive differences). The effects of motives and gains on exercise-related processes and outcomes (behavioral regulation, exercise amount, satisfaction, and intention) are considered in another paper (Ingledew, Markland, & Strömmer, 2014).

The expected findings were that:

1. Motive and gain items would reflect their intended constructs, and motive and gain constructs, though correlated, would be distinct.

2. The higher-order structure of motives would be similar to that identified by Ingledew & Markland (2008), that is to say health-fitness, appearance-weight, social engagement, and enjoyment related groupings. The higher order structure of gains might be somewhat different.

3. There would be discrepancies between gains and motives, of varying size and direction. For example, gains that are harder to attain or perceive, such as perhaps health-related gains, would show negative mean differences between motives and gains. Conversely readily attainable or perceptible gains, such as perhaps social gains, would show positive mean differences between motives and gains.

Method

Design and Sample

The study was a cross-sectional survey using a questionnaire. Ethical approval was granted by a University departmental ethics committee. Participants were adults between 18 and 35 years of age. They were recruited from communal areas of a British university (e.g., kitchens and lounges of halls of residence, cafeterias, seating areas), rather than from sport and exercise facilities, so as to ensure a wide range of exercise participation levels. A total of 210 individuals completed the questionnaire. However, 14 (7%) of these did not complete the gains section of the questionnaire because they had not engaged in *any* exercise in the past 12 months. Therefore, the effective sample size was 196. Of these, 60% (118/196) were women and 40% (78/196) men. The mean age was 22.12 years (*SD* 3.08). The mean BMI was 22.53 (*SD*), and 55% belonged to a club in order to participate in sport or recreational physical activity.

Measures

EMGI. The EMGI comprised a motives section and a gains section. The motives section was the EMI-2 (Markland & Ingledew, 1997). The instructions and stem for this section (see Appendix) invited participants to focus on their personal reasons as to why they exercise or might exercise. The items (see Appendix) were of the form "To ...", or "Because ...", or "For ...". The gains section was newly created. The instructions and stem for this section (see Appendix) invited participants to focus on their personal experience of exercise and what they had gained from it. The items (see Appendix) were of the form "I have ...", or "I have been able to ...", or "It has allowed me to ...", or "It has enabled me to ...". Each gain item corresponded to a particular motive item. For example, the gain item "[My personal experience of exercise has been that] it has helped me to maintain good health" corresponded to the motive item "[I exercise] to maintain good health". For each gain item, the wording

was determined by consensus between the three authors. For both motives and gains sections, response options ranged from *not at all true for me* (0) to *very true for me* (4). The order of items was randomized, separately for each section. Each section comprised 51 items forming 14 scales of 3 or 4 items each.

Other measures. The motives and gains measures were presented along with other measures, in the following order: exercise motives (EMGI) and behavioral regulation of exercise (Behavioural Regulation in Exercise Questionnaire 2: Markland & Tobin, 2004); exercise amount, stage of change, and intention; affect (Positive and Negative Affect Scale: Watson, Clark, & Tellegen, 1988); exercise gains (EMGI) and exercise satisfaction. The order of measures was designed to flow well, whilst separating gains from motives. Analyses using some of the other measures are reported elsewhere (Ingledew et al., 2013).

Analyses

Missing values. Missing values were imputed. As there were only seven missing data points, single imputation by expectation-maximization was used (Olinsky, Chen, & Harlow, 2003).

Confirmatory factor analysis of items. The EMGI item scores were subjected to confirmatory factor analyses (CFA) using Mplus version 7 (Muthén & Muthén, 2012). This was to assess how well items reflected intended constructs and whether motive and gain constructs were distinct. A CFA approach was adopted in this study because the gain items were developed based on existing motive items from the EMI-2. The 14-factor structure of the EMI-2 has been previously established with items reflecting their intended constructs and constructs being discriminated from each other (Markland & Ingledew, 1997). Due to the well-established factor structure of the EMI-2, there were strong hypotheses for the factor structure of the gain scales. Because of these hypotheses, the CFA approach was deemed appropriate. Based on the factor structure of the motives scale, a series of 14 two-factor

models was tested. In each model, a motive construct was examined alongside the corresponding gain construct. To illustrate, in the two-factor model for affiliation, the four motive items were free to load onto one factor, the four gain items onto another factor (Figure 1). The affiliation motive and affiliation gain factors were allowed to correlate. The measurement errors of corresponding motive and gain items (e.g., "To make new friends" and "I have made new friends") were also allowed to correlate, to accommodate their matching content. For each model, we examined the Satorra-Bentler scaled χ^2 (Satorra & Bentler, 1994), which adjusts for multivariate nonnormality, the Comparative Fit Index, and the Standardized Root Mean Square Residual (SRMR). Following Hu and Bentler (1999), the criterion for adequate fit was a combination of CFI close to .95 and SRMR close to .08. For completeness, we also report the Root Mean Square Error of Approximation (RMSEA). The discriminant validity of the scales was assessed by calculating the average variance extracted (AVE) (Fornell & Larcker, 1981) and comparing that to the inter-scale correlations. Discriminant validity is considered to be confirmed when the AVE estimates for both constructs (motive and gain) are greater than their shared variance (i.e., square of the correlation) (Fornell & Larcker, 1981). Having established the factor structures of the items, we then computed motive and gain scale scores as the means of item scores (i.e., unit weighted composite scores).

Exploratory structural equation modeling of scales. The EMGI scale scores were subjected to exploratory structural equation modeling (ESEM) following procedures outlined by Asparouhov and Muthén (2009) within Mplus version 7 (Muthén & Muthén, 2012). This was to explore the higher order factor structures of motives and gains. The ESEM approach was deemed appropriate as motives had a hypothesised higher order factor structure based on previous work on the EMI-2 (Ingledew & Markland, 2008) but gains were not necessarily expected to exhibit the same higher order factor structure. The ESEM approach was adopted

in preference to CFA because we did not hypothesize that the structures of motives and gains would necessarily be the same, nor did we hypothesize strictly simple factor structures. ESEM was adopted in preference to traditional exploratory factor analysis because it provides a range of fit statistics, and allows comparison of models to determine the optimal number of factors. The term 'exploratory structural equation modelling' is potentially misleading when applied purely to factor analysis as this does not include the estimation of structural relations between latent variables. Nevertheless, ESEM procedures have been widely used for factor analytic purposes (c.f., Guay Morin, Litalien, Valois, & Vallerand, 2015). Guay et al. draw a distinction between the use of ESEM as a confirmatory factor analytic procedure, where the number of factors are specified a priori, and its use as an exploratory factor analytic procedure where model fit information is used to determine the optimal number of factors to extract. In the current study, ESEM was used in an exploratory fashion. Separate analyses were conducted for motives and gains. For each of these, six models were sequentially fitted to the data, systematically increasing the number of factors from one to six and the models were compared using Satorra-Bentler χ^2 difference tests (ΔSatorra-Bentler χ^2, Satorra & Bentler, 2001), with alpha set to .01 due to the susceptibility of this approach to lead to over-factoring (c.f., Myers Chase, Pierce, & Martin,2011). Oblique (promax) rotation was used. In each analysis, the number of factors was constrained, but (in contrast to confirmatory factor analysis) each item was free to load on any factor. For ESEM with promax rotation and a robust estimator, Mplus only produces the Satorra-Bentler scaled χ^2, Root Mean Square Residual (RMR), and RMSEA. We report these as well as the CFI, calculated by hand.

Differences between means. To compare mean differences between motives and gains, a *t*-test and correlation were then conducted for each pairing of motive scale with its

corresponding gain scale[1]. Negative mean differences denote a lower gain relative to the original motive, conversely positive mean differences denote a higher gain relative to the original motive.

[1] It was not possible to compute the difference between factor means in the CFAs. Multi-group CFA was not appropriate, since motives and gains were not separate groups. In principle, latent change analysis might have been appropriate (motives changing into gains). However, in practice, this would have required strong factorial invariance across motives and gains (same configuration, equal loadings and intercepts), whereas we only hypothesised configural factorial invariance (same configuration, unconstrained loadings and intercepts).

Results

CFAs of Items

The results of the CFAs of item scores are shown in Table 1. The Satorra-Bentler scaled χ^2 was non-significant for 11 of the 14 models, though not for Enjoyment, Social Recognition, and Weight Management. However, all 14 models met the criteria for adequate fit according to the CFI (≥ .95) and SRMR (≤ .08). Factor loadings were greater than .60 for 92 of the 102 items. The lowest loadings were for the appearance motive item "look younger" (.47) and the health pressures motive item "recover from an illness or injury" (.49). The correlations of motive factors with corresponding gain factors were all positive, and the 95% confidence intervals of these correlations all had lower boundaries above 0.00 and upper boundaries below 1.00, except for Revitalization which had an upper boundary of 1.00 (95% CI [.86, 1.00]). Discriminant validity was satisfactory for affiliation, appearance, competition, ill health avoidance, nimbleness, positive health and strength and endurance. The AVEs for the corresponding motives and gains scales were smaller than their shared variance for challenge, enjoyment, health pressures, revitalisation, social recognition, and stress management. The AVE for weight management motive (.70) was higher than the shared variance (.55), whereas the AVE for weight management gain was lower (.52).

The means, standard deviations, internal consistencies, and motive-gain correlations of the scales are shown in Table 2. Means (on a scale from 0 to 4) were not strikingly low or high, except for Health Pressures Motive (M = 0.96) and Gain (0.87), and Positive Health Motive (3.23). Cronbach's alpha was above .70, with the exception of Health Pressures Motive (α = .54), Health Pressures Gain (α =.68), and Revitalization Motive (α =.68). The correlations of motive scales with corresponding gain scales were all significant and positive, and were notably high for Enjoyment (r = .83), Competition (.84), and Stress Management (.86).

ESEMs of Scales

In the ESEMs of scales, for both motives and gains, fit improved significantly with more factors up to five, according to the ΔSatorra-Bentler χ^2 tests. To save space, we only report findings for the three models with the most factors (four, five and six). The results for all factor solutions tested are available from the first author by request. The results of the four factor model for motives showed adequate fit: Satorra-Bentler χ^2 (41) = 102.85, $p < .001$, CFI = .95, RMR = .04, RMSEA = .08. So did the 4-factor model for gains: Satorra-Bentler χ^2 (41) = 85.81, $p < .001$, CFI = .98, RMR = .03, RMSEA = .08. The five-factor model for motives fitted well: Satorra-Bentler χ^2 (31) = 56.11, $p = .004$, CFI = .98, RMR = .02, RMSEA = .06. So did the five factor model for gains: Satorra-Bentler χ^2 (31) = 56.43, $p = .004$, CFI = .99, RMR = .02, RMSEA = .07. A six-factor model for motives failed to converge, and a six-factor model for gains gave an improper solution. Chi square difference tests confirmed that the five factor model for motives fitted significantly better than a four factor model: ΔSatorra-Bentler $\chi^2 = 45.52$, $\Delta df = 10$, $p < .001$. The five factor model for gains also fitted significantly better than a four factor model: ΔSatorra-Bentler $\chi^2 = 28.34$, $\Delta df = 10$, $p < .01$. Therefore, a five-factor model was deemed optimal for both motives and gains. The five-factor models are shown in Tables 3 (motives) and 4 (gains).

The factor structures of motives (Figure 2) and gains (Figure 3) were similar in many respects. Both motives and gains had a Social Engagement factor, encompassing Affiliation, Challenge, Competition, and Social Recognition. Both also had an Enjoyment/Revitalization factor, encompassing Enjoyment, Revitalization and Stress Management. Both had a Negative Health factor, encompassing Health Pressures and Ill-Health Avoidance. Both also had a Health/Fitness factor, encompassing Positive Health, Strength/Endurance and Nimbleness, and also to some extent Ill-Health Avoidance. However, motives had an Appearance/Weight Management factor, whereas gains had a Weight Management factor,

with Appearance gain loading predominantly on the Health/Fitness factor. Correlations between factors were more positive for gains (range .15 to .64) than for motives (-.18 to .51).

Differences between Means

The differences between motives and gains composite scores are shown in Table 2. There were significant positive differences (gain greater than motive) for Affiliation, Challenge, Enjoyment, Nimbleness, Social Recognition and Strength and Endurance, and negative differences (motive greater than gain) for Ill-Health Avoidance and Positive Health.

Discussion

Main Findings

The results were consistent with expectations, with minor exceptions. All EMGI items reflected their intended constructs. There were two factor loadings that were comparatively low. These were the appearance motive item “look younger”, and the health pressures motive item "recover from an illness or injury". It is likely that these items do not apply well to the present sample of healthy young adults, but could apply to other samples. Correlations between motive factors and corresponding gain factors were all positive, and the 95% confidence intervals excluded 1.00 except for Revitalization where it touched 1.00. Discriminant validity was confirmed by AVE for affiliation, appearance, competition, ill health avoidance, nimbleness, positive health and strength and endurance. AVE for challenge, enjoyment, health pressures, revitalisation, social recognition, stress management and weight management did not fully support discriminant validity. Discriminant validity for these scales based on the AVE’s is an issue, and arises from the similar wording and content of the corresponding motive and gain scales. Further research is required to establish the discriminant validity of the scales. The true test of the discriminant validity of the scales will be whether they have differential predictive capabilities in practice. Some support for this has already been established (Ingledew, Markland, & Strömmer, 2014). The higher order structures of motives and gains were similar in many respects. However, appearance motive was associated with weight management, whereas appearance gain was associated with health and fitness. Gain factors were more positively intercorrelated than were motive factors. There were significant mean differences between some motives and gains. Positive mean differences suggested a higher degree of attainability for affiliation, challenge, enjoyment, nimbleness, social recognition and strength and endurance, whereas negative differences suggested a low degree of attainability for ill-health avoidance and positive health, with

appearance, competition, health pressures, revitalization, stress management, and weight management. Overall, the aim, to develop a measure of gains that corresponded to the existing EMI-2 measure of motives, was met.

Theoretical Implications

It seems that people can distinguish between their motives and their gains. Even though the motive and gain items were similar in wording and proximal in time, the psychometric results indicate clear separation of constructs for many of the scales used. Results indicated less than desirable discriminant validity for challenge, enjoyment, health pressures, revitalization, social recognition, stress management and weight management. The motives for enjoyment, revitalization, stress management and challenge are prominent in habitual exercisers and could have come into an alignment with their corresponding gains due to individuals pursuing activities they know will fulfil their motives. The scales for health pressures, positive health and social recognition and weight management could represent gains that are difficult for participants to gauge because these gains are slow to materialise and/or difficult to perceive. It remains to be seen whether discriminant validity for these scales might improve when the motives and gains measures are used at a longer time interval. Nevertheless, even if highly correlated, they might be useful for research because asking about motives and gains in this way taps into a natural form of discourse. Having asked someone what they want from exercise ("I want to lose some weight") it is natural to then ask them what they have gained ("No, I haven't lost much weight, but I have felt much more relaxed"), and perhaps odd not to ask.

The positive associations between motives and corresponding gains (evident in the factor-factor correlations and the scale-scale correlations) could reflect two possible causal relationships. It may be that people who strive for something (motive) are generally more likely to attain it and to notice if they do attain it (gain). It may alternatively or additionally

be that people come to seek (motive) what they happen to get and appreciate (gain). They may not have initially been aware that such a gain was possible, or that they would appreciate it. Correlations may be particularly high for some motives such as enjoyment and competition because these are prominent in regular exercisers (Ingledew et al., 1998) in whom there would be more opportunity for motives and gains to come into alignment. Whatever the explanation for the positive correlations, previous research findings on the effects of motives may have been confounded by unmeasured but correlated gains. In light of this, previous conclusions about the effects of motives will need to be re-evaluated (see Ingledew et al., 2013).

The differences in higher-order structures of motives and gains are intriguing. From motive to gain, appearance shifted its association from weight management to health and fitness. Perhaps initially people see weight loss as the primary means to improve their appearance. However, in due course they come to recognize that physical changes such as muscle tone and agility also convey a positive impression. These different characteristics of appearance motive and appearance gain may reflect a shift in body image from investment (excessive preoccupation) to evaluation (constructive management) (cf. Carraça et al., 2011). From motive to gain, intercorrelations between factors became more positive. Perhaps initially most individuals want a limited number of things out of exercise. However, they subsequently experience a range of other benefits, which they acknowledge as personal gains. The different higher-order structures of motives and gains mean that one would need to think carefully and perhaps do preliminary analyses before aggregating motives and gains when studying their effects.

There may be two reasons for the mean within-person differences between gains and motives. Some gains may be easier to actually attain, or easier to perceive, or both. For example, ill health avoidance may be difficult to attain (could take a long time) and to

perceive (few overt signs). Affiliation may be relative easier to attain (exercise often has a strong social element) and to perceive (plenty of overt signs). Weight management may be difficult to attain in practice but easy to perceive should it happen. However, it is important to note that around each of the mean within-person differences, there was extensive individual difference (SD), so that in all instances there were some individuals who gained less than they wanted, some who gained about what they wanted, and some who gained more than they wanted.

Future Directions

Further research is needed to ascertain the psychometric properties of the EMGI in a variety of populations. From a theoretical perspective, the value of the instrument will lie in the study of the *consequences* and *causes* of motives and gains. It will provide a means of studying how motives and gains influence exercise-related processes and outcomes, including their interactive effects (see Ingledew et al., 2013). It will also provide a means of studying how motives and gains arise, including how they influence each other. Longitudinal and experimental designs will allow for more precise determination of causality. Such studies of change over time and response to interventions are particularly illuminating in the ongoing effort to validate the use of an instrument (Messick, 1995). It might be possible to measure gains in other ways such as developing standalone gains measures, but the instrument created here is presented as a means of measuring gains corresponding to an existing measure of motives for exercising. Ultimately, the instrument may merit use within public health programs to promote physical activity.

References

Asparouhov, T., & Muthén, B. (2009). Exploratory structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 16,* 397-438. doi:10.1080/10705510903008204

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process and content. *Psychological Bulletin, 120,* 338-375. doi:10.1037/0033-2909.120.3.338

Carraça, E. V., Silva, M. N., Markland, D., Vieira, P. N., Minderico, C. S., Sardinha, L. B., & Teixeira, P. J. (2011). Body image change and improved eating self-regulation in a weight management intervention in women. *International Journal of Behavioural Nutrition and Physical Activity, 8,* 75. doi:10.1186/1479-5868-8-75.

Cizek, G. J. (2012). Defining and distinguishing validity: Interpretations of score meaning and justifications of test use. *Psychological Methods, 17,* 31-43. doi:10.1037/a0026975

Clary, E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J., & Miene, P. (1998). Understanding and assessing the motivations of volunteers: A functional approach. *Journal of Personality and Social Psychology, 74,* 1516-1530. doi:10.1037/0022-3514.74.6.1516

Dacey, M., Baltzell, A., & Zaichkowsky, L. (2008). Older adults' intrinsic and extrinsic motivation toward physical activity. *American Journal of Health Behavior, 32,* 570-582. Retrieved from http://www.ajhb.org

Davis, M. H., Hall, J. A., & Meyer, M. (2003). The first year: Influences on the satisfaction, involvement, and persistence of new community volunteers. *Personality and Social Psychology Bulletin, 29,* 248-260. doi:10.1177/0146167202239050

Duda, J. L., & Tappe, M. K. (1989). The personal incentives for exercise questionnaire: Preliminary development. *Perceptual and Motor Skills, 68,* 1122-1122. doi: 10.2466/pms.1989.68.3c.1122

Egli, T., Bland, H. W., Melton, B. F., & Czech, D. R. (2011). Influence of age, sex, and race on college students exercise motivation of physical activity. *Journal of American College Health*, 59, 399-406.

Finkelstein, M. A. (2006). Dispositional predictors of organizational citizenship behavior: Motives, motive fulfillment, and role identity. *Social Behavior and Personality, 34*, 603-616. doi:10.2224/sbp .2006.34.6.603

Finkelstein, M. A. (2007). Correlates of satisfaction in older volunteers: A motivational perspective. *International Journal of Volunteer Administration, 24*(5), 6–12. Retrieved from http://www.ijova.org/PastIssues/xxiv_5.htm

Finkelstein, M. A. (2008). Volunteer satisfaction and volunteer action: A functional approach. *Social Behavior and Personality, 36*, 9-18. doi:10.2224/sbp.2008.36.1.9

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*, 39-50. doi: 10.2307/3151312

Funk, D., Jordan, J., Ridinger, L., & Kaplanidou, K. (2011). Capacity of mass participant sport events for the development of activity commitment and future exercise intention. *Leisure Sciences, 33*, 250-268. doi:10.1080/01490400.2011.564926

Grogan, S., Conner, M., & Smithson, H. (2006). Sexuality and exercise motivations: Are gay men and heterosexual women most likely to be motivated by concern about weight and appearance? *Sex Roles, 55*, 567-572. doi:10.1007/s11199-006-9110-3

Guay, F., Morin, A. J. S., Litalien, S., Valois, P., Vallerand, R. J. (2015). Application of exploratory structural equation modeling to evaluate the academic motivation scale. The Journal of Experimental Education, 83, 51-82. doi: 10.1080/00220973.2013.876231

Halliwell, E., Dittmar, H., Orsborn, A. (2007). The effects of exposure to muscular male models among men: Exploring the moderating role of gym use and exercise motivation. *Body Image, 4*, 278-287. doi: 10.1016/j.bodyim.2007.04.006

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1-55. doi:10.1080/10705519909540118

Ingledew, D. K., & Markland, D. (2008). The role of motives in exercise participation. *Psychology and Health, 23*, 807-828. doi:10.1080/08870440701405704

Ingledew, D. K., Markland, D., & Ferguson, E. (2009). Three levels of exercise motivation. *Applied Psychology: Health and Well-Being, 1*, 336-355. doi:10.1111/j.1758-0854.2009.01015.x

Ingledew, D. K., Markland, D., & Medley, A. R. (1998). Exercise motives and stages of change. *Journal of Health Psychology, 3*, 477-489. doi: 10.1177/135910539800300403

Ingledew, D. K., Markland, D., & Strömmer, S. T. (2014). Elucidating the roles of motives and gains in exercise participation. *Sport, Exercise, and Performance Psychology*, 3, 116-131. doi: 10.1037/spy0000004

Ingledew, D. K., & Sullivan, G. (2002). Effects of body mass and body image on exercise motives in adolescence. *Psychology of Sport and Exercise, 3*, 323-338. doi: 10.1016/S1469-0292(01)00029-2

Izquierdo-Porrera, A. M., Powell, C. C., Reiner, J., & Fontaine, K. R. (2002). Correlates of exercise adherence in an African American church community. *Cultural Diversity and Ethnic Minority Psychology, 8*, 389-394. doi:10.1037//1099-9809.8.4.389

Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health, 54*, 87-94. doi:10.3200/JACH.54.2.87-94

Kulavic, K., Hultquist, C. N., McLester, J.R. (2013). A comparison of motivational factors and barriers to physical activity among traditional versus nontraditional college students, *Journal of American College Health, 61,* 60-66. doi: 10.1080/07448481.2012.753890

Leary, M. R., & Kowalski, R. M. (1990). Impression management: A literature review and two-component model. *Psychological Bulletin, 107,* 34-47. doi: 10.1037/0033-2909.107.1.34

Maltby, J., & Day, L. (2001). The relationship between exercise motives and psychological well-being. *Journal of Psychology, 135,* 651-660. doi:10.1080/00223980109603726

Markland, D., & Ingledew, D. K. (1997). The measurement of exercise motives: Factorial validity and invariance across gender of a revised exercise motivations inventory. *British Journal of Health Psychology, 2,* 361-376. doi:10.1111/j.2044-8287.1997.tb00549.x

Markland, D., & Ingledew, D.K. (2007). Exercise participation motives: A self-determination theory perspective. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 23-34). Champaign, IL: Human Kinetics.

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50,* 741-749. doi:10.1037/0003-066X.50.9.741

Markland, D., & Tobin, V. (2004). A modification to the behavioural regulation in exercise questionnaire to include an assessment of amotivation. *Journal of Sport and Exercise Psychology, 26,* 191-196. Retrieved from http://journals.humankinetics.com/jsep

Muthén, L. K., & Muthén, B. O. (2012). *Mplus (Version 7).* [Computer Software]. Los Angeles, CA: Muthén & Muthén.

Myers, N. D., Chase, M. A., Pierce, S. W., & Martin, E. (2011). Coaching efficacy and exploratory structural equation modeling: A substantive-methodological synergy. *Journal*

of Sport and Exercise Psychology, 33, 779. Retrieved from http://journals.humankinetics.com/jsep-back-issues/jsep-volume-33-issue-6-december/coaching-efficacy-and-exploratory-structural-equation-modeling-a-substantive-methodological-synergy

Olinsky, A., Chen, S., & Harlow, L. (2003). The comparative efficacy of imputation methods for missing data in structural equation modeling. *European Journal of Operational Research, 151,* 53-79. doi:10.1016/S0377-2217(02)00578-7

Quindry, J. C., Yount, D., O'Bryant, H., & Rudisill, M. E. (2011). Exercise engagement is differentially motivated by age-dependent factors. *American Journal of Health Behavior, 35,* 334-345. doi:10.5993/AJHB.35.3.7

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68-78. doi:10.1037/0003-066X.55.1.68

Ryan, R. M., Frederick, C. M., Lepes, D., Rubio, N., & Sheldon, K. M. (1997). Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology, 28,* 335-354.

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.) *Latent variables analysis: Applications for developmental research* (pp. 339-419). Thousand Oaks, CA: Sage.

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66,* 507-514. doi:10.1007/BF02296192

Sebire, S. J., Standage, M., & Vansteenkiste, M. (2008). Development and validation of the goal content for exercise questionnaire. *Journal of Sport and Exercise Psychology, 30,* 353-377. Retrieved from http://journals.humankinetics.com/jsep

Shen, B., & Xu, C. (2008). Effects of self-efficacy, body mass, and cardiorespiratory fitness on exercise motives in chinese college students. *Journal of Physical Activity and Health, 5*, 706-718. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18820345

Silberstein, L. R., Striegel-Moore, R. H., Timko, C., & Rodin, J. (1988). Behavioral and psychological implications of body dissatisfaction: Do men and women differ? *Sex Roles, 19*, 219-232. doi: 10.1007/BF00290156

Strong, H. A., Martin Ginis, K. A., Mack, D. E., & Wilson, P. M. (2006). Examining self-presentational exercise motives and social physique anxiety in men and women. *Journal of Applied Biobehavioural Research, 11*, 209-225. doi: 10.1111/j.1751-9861.2007.00006.x

Vansteenkiste, M, Lens, W., & Deci, E.L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist, 41*, 19-31. doi: 10.1207/s15326985ep4101_4

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070. doi:10.1037/0022-3514.54.6.1063

Zajac, A. U., & Schier, K. (2011). Body image dysphoria and motivation to exercise: A study of Canadian and Polish women participating in yoga and aerobics. *Archives of Psychiatry and Psychotherapy, 4*, 67-72. Retrieved from http://www.archivespp.pl/2011-13-4.html

Appendix A

Motive and Gain Items

The instructions for motives were "Following are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not,* please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, or *would be true* for you personally if you did exercise ...". The stem was "Personally, I exercise (or might exercise) ...".

The instructions for gains were "This section of the questionnaire can only be completed by people who have some current or recent experience of exercise. So if you have not exercised within the last twelve months, please just put a cross here and skip this section. The questions are about what you have actually gained from exercise. This may be the same or different from what you originally wanted or hoped to gain. Please tell us your personal experience of exercise using the following scale ...". The stem was "My personal experience of exercise has been that ...".

Concept	Motive item	Gain item
Affiliation	To spend time with friends	It has allowed me to spend time with friends
	To enjoy the social aspects of exercising	I have enjoyed the social aspects of exercising
	To have fun being active with other people	I have had fun being active with other people
	To make new friends	I have made new friends through exercise
Appearance	To help me look younger	It has helped me to look younger
	To have a good body	It has helped me to have a better body
	To improve my appearance	I have been able to improve my appearance
	To look more attractive	It has helped me to look more attractive
Challenge	To give me goals to work towards	It has given me goals to work towards
	To give me personal challenges to face	It has given me personal challenges to face
	To develop personal skills	I have been able to develop personal skills
	To measure myself against personal standards	It has allowed me to measure myself against personal standards
Competition	Because I like trying to win in physical activities	I have liked trying to win in physical activities
	Because I enjoy competing	I have been able to enjoy competing
	Because I enjoy physical competition	I have been able to enjoy physical competition
	Because I find physical activities fun, especially when competition is involved	I have found physical activities fun, especially when competition was involved
Enjoyment	Because I enjoy the feeling of exerting myself	I have enjoyed the feeling of exerting myself
	Because I find exercising satisfying in and of itself	I have found exercising satisfying in and of itself
	For enjoyment of the experience of exercising	I have found the experience of exercising enjoyable

Concept	Motive item	Gain item
	Because I feel at my best when exercising	I have felt at my best when exercising
Health Pressures	Because my doctor advised me to exercise	I have followed my doctor's advice by exercising
	To help prevent an illness that runs in my family	It has helped reduce the risk of an illness that runs in my family
	To help recover from an illness/injury	It has helped me to recover from an illness/injury
Ill Health Avoidance	To avoid ill-health	I have been able to avoid ill-health
	To prevent health problems	I have been able to prevent health problems
	To avoid heart disease	It has reduced my risk of heart disease
Nimbleness	To stay/become more agile	I have stayed/become more agile through exercise.
	To maintain flexibility	It has helped me to maintain flexibility
	To stay/become flexible	I have been able to stay/become flexible
Positive Health	To have a healthy body	It has helped me to have a healthy body
	Because I want to maintain good health	It has helped me to maintain good health
	To feel more healthy	I have felt more healthy
Revitalization	Because it makes me feel good	I have felt good through exercising
	Because I find exercise invigorating	I have found exercise invigorating
	To recharge my batteries	It has helped me to recharge my batteries
Stress Management	To give me space to think	It has given me space to think
	Because it helps to reduce tension	It has helped me to reduce tension
	To help manage stress	I have been able to manage stress through exercising
	To release tension	I have released tension by exercising
Social Recognition	To show my worth to others	I have been able to show my worth to others
	To compare my abilities with other peoples'	It has allowed me to compare my abilities with other peoples'
	To gain recognition for my accomplishments	I have gained recognition for my accomplishments
	To accomplish things that others are incapable of	It has allowed me to accomplish things that others are incapable of
Strength and Endurance	To build up my strength	I have built up my strength through exercising
	To increase my endurance	I have increased my endurance
	To get stronger	It has helped me to get stronger
	To develop my muscles	I have been able to develop my muscles
Weight Management	To stay slim	It has enabled me to stay slim

Concept	Motive item	Gain item
	To lose weight	I have lost weight through exercising
	To help control my weight	It has helped control my weight
	Because exercise helps me to burn calories	It has helped me to burn calories

Table 1

Confirmatory Factor Analyses of Motive and Gain Items

	Factor loadings		Average Variance Extracted			Fit statistics			
Construct, and essence of items	Motive	Gain	Motive	Gain	Correlation between factors (95% CI)	Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Affiliation			.68	.75	.80 (.74, .87)	$\chi^2(15) = 20.55$, $p = .15$	.02	1.00	.04
Spend time with friends	.87	.91							
Enjoy the social aspects of exercising	.84	.88							
Have fun being active with other people	.83	.84							
Make new friends	.76	.82							
Appearance			.64	.59	.62 (.49, .74)	$\chi^2(15) = 19.35$, $p = .20$	.03	1.00	.04
Help me look younger	.47	.51							
Have a good body	.84	.70							
Improve my appearance	.92	.88							
Look more attractive	.90	.92							
Challenge			.47	.59	.79 (.69, .89)	$\chi^2(15) = 15.88$, $p = .39$	.03	1.00	.02
Give me goals to work towards	.69	.84							
Give me personal challenges to face	.83	.78							
Develop personal skills	.62	.62							
Measure myself against personal standards	.59	.81							
Competition			.81	.82	.87 (.82, .92)	$\chi^2(15) = 25.05$, $p = .05$	.02	.99	.06
Like trying to win in physical activities	.91	.91							
Enjoy competing	.86	.90							
Enjoy physical competition	.93	.93							

	Factor loadings		Average Variance Extracted			Fit statistics			
Construct, and essence of items	Motive	Gain	Motive	Gain	Correlation between factors (95% CI)	Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Find physical activities fun, especially when competition is involved	.89	.88							

	Factor loadings		Average Variance Extracted			Fit statistics			
Construct, and essence of items	Motive	Gain	Motive	Gain	Correlation between factors (95% CI)	Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Enjoyment			.60	.69	.91 (.87, .95)	$\chi^2(15) = 27.13$, $p = .03$	.03	.99	.06
Enjoy the feeling of exerting myself	.71	.74							
Find exercising satisfying in and of itself	.79	.93							
For enjoyment of the experience of exercising	.82	.85							
Feel at my best when exercising	.77	.80							
Health Pressures			.29	.43	.80 (.64, .96)	$\chi^2(5) = 5.96$, $p = .31$	.02	1.00	.03
My doctor advised me to exercise	.60	.73							
Help prevent an illness that runs in my family	.54	.66							
Help recover from an illness/injury	.49	.56							
Ill Health Avoidance			.65	.60	.58 (.45, .71)	$\chi^2(5) = 9.18$, $p = .10$	.04	.99	.07
Avoid ill-health	.93	.84							
Prevent health problems	.76	.84							
Avoid heart disease	.71	.62							
Nimbleness			.68	.73	.74 (.64, .83)	$\chi^2(5) = 2.17$, $p = .82$	.01	1.00	.00
Stay/become more agile	.75	.72							
Maintain flexibility	.81	.94							
Stay/become flexible	.90	.88							
Positive Health			.60	.56	.60 (.47, .74)	$\chi^2(5) = 3.65$, $p = .60$	.02	1.00	.00

	Factor loadings		Average Variance Extracted			Fit statistics			
Construct, and essence of items	Motive	Gain	Motive	Gain	Correlation between factors (95% CI)	Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Have a healthy body	.87	.80							
Want to maintain good health	.73	.81							
Feel more healthy	.71	.62							
Revitalization			.43	.54	.93 (.86, 1.00)	$\chi^2(5) = 3.18$, $p = .67$	.02	1.00	.00
Makes me feel good	.78	.92							
Find exercise invigorating	.55	.69							
Recharge my batteries	.61	.56							

	Factor loadings		Average Variance Extracted			Fit statistics			
Construct, and essence of items	Motive	Gain	Motive	Gain	Correlation between factors (95% CI)	Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Social Recognition			.47	.55	.81 (.74, .88)	$\chi^2(15) = 42.40$, $p <$ .001	.04	.96	.10
Show my worth to others	.73	.79							
Compare my abilities with other peoples'	.56	.82							
Gain recognition for my accomplishments	.70	.66							
Accomplish things that others are incapable of	.75	.69							
Strength and Endurance			.70	.69	.67 (.56, .78)	$\chi^2(15) = 21.38$, $p = .13$	.03	.99	.05
Build up my strength	.90	.94							
Increase my endurance	.66	.62							
Get stronger	.90	.88							
Develop my muscles	.88	.85							
Stress Management			.65	.69	.92 (.88, .95)	$\chi^2(15) = 23.39$, $p = .08$	.03	.99	.05
Give me space to think	.63	.71							
Helps to reduce tension	.83	.84							
Help manage stress	.82	.82							
Release tension	.93	.94							
Weight Management			.70	.52	.74 (.66, .83)	$\chi^2(15) = 31.14$, $p = .01$	.04	.98	.07
Stay slim	.67	.57							
Lose weight	.81	.69							

	Factor loadings		Average Variance Extracted			Fit statistics			
Construct, and essence of items	Motive	Gain	Motive	Gain	Correlation between factors (95% CI)	Satorra-Bentler χ^2	Standardized Root Mean Square Residual	Comparative Fit Index	Root Mean Square Error of Approximation
Help control my weight	.96	.84							
Helps me to burn calories	.88	.77							

Note. $N = 196$.

Table 2

Descriptive Statistics, Correlations and Differences for Motive and Gain Scales

	Motive			Gain			Correlation between motive and gain	Gain minus motive *M (SD)*
Construct	*M*	*SD*	Cronbach's α	*M*	*SD*	Cronbach's α		
Affiliation	1.87	1.15	.89	2.14	1.30	.92	.75**	0.27 (0.88)**
Appearance	2.21	0.99	.86	2.15	0.98	.83	.58**	-0.06 (0.90)
Challenge	2.21	0.92	.77	2.44	1.02	.85	.69**	0.23 (0.77)**
Competition	1.87	1.27	.94	1.90	1.36	.95	.84**	0.03 (0.76)
Enjoyment	2.52	1.00	.86	2.81	1.00	.89	.83**	0.28 (0.59)**
Health Pressures	0.96	0.87	.54	0.87	0.91	.68	.72**	-0.09 (0.67)
Ill-Health Avoidance	2.36	1.05	.82	2.10	1.05	.81	.53**	-0.26 (1.02)**
Nimbleness	2.28	1.00	.86	2.52	1.05	.88	.68**	0.24 (0.82)**
Positive Health	3.23	0.74	.81	2.80	0.85	.79	.51**	-0.43 (0.80)**
Revitalization	2.46	0.91	.68	2.51	0.99	.74	.78**	0.05 (0.63)
Social Recognition	1.39	0.94	.78	1.71	1.04	.83	.70**	0.32 (0.78)**
Strength and Endurance	2.62	1.00	.90	2.75	0.94	.89	.62**	0.13 (0.85)*
Stress Management	2.40	1.09	.87	2.42	1.12	.90	.86**	0.02 (0.59)
Weight Management	2.48	1.15	.89	2.49	1.00	.80	.69**	0.01 (0.86)

*$p < .05$. **$p < .01$.

Note. $N = 196$.

Table 3

Exploratory Structural Equation Modeling of Motive Scales

Variable	Factor				
	1. Appearance/ Weight Management	2. Negative Health	3. Social Engagement	4. Health/Fitness	5. Enjoyment/ Revitalization
	Scale-factor loadings				
Appearance	.88	-.11	.21	.14	-.04
Weight Management	.70	.13	-.05	.06	.05
Affiliation	-.03	.01	.55	-.09	.13
Challenge	.11	-.12	.52	.15	.23
Competition	-.25	.09	.63	.13	-.01
Social Recognition	.19	.10	.99	-.12	-.10
Enjoyment	-.06	-.21	.09	.15	.79
Revitalization	.04	.03	-.08	.05	.90
Stress Management	.01	.23	.11	-.12	.73
Health Pressures	-.06	.73	.15	.05	-.01
Ill-Health Avoidance	.16	.46	-.10	.58	-.10
Positive Health	.31	-.02	-.18	.61	.11
Nimbleness	-.02	.18	-.04	.41	.20
Strength/Endurance	.01	-.04	.25	.60	-.04
	Factor correlations				
1. Appearance/Weight Management	-				
2. Negative Health	.28	-			
3. Social Engagement	-.18	-.05	-		
4. Health/Fitness	.40	.17	.26	-	
5. Enjoyment/Revitalization	.12	.10	.52	.51	-

Note. $N = 196$. Satorra-Bentler $\chi^2(31) = 56.11$, $p = .004$; Root Mean Square Residual = .02; Comparative Fit Index = .98; Root Mean Square Error of Approximation = .06.

Table 4

Exploratory Structural Equation Modeling of Gain Scales

	Factor				
Variable	1. Health/Fitness	2. Weight Management	3. Social Engagement	4. Enjoyment/ Revitalization	5. Negative Health
			Item-factor loadings		
Appearance	.58	.27	.11	-.08	.09
Weight Management	.08	.99	.02	.01	-.00
Affiliation	-.05	.00	.70	.14	-.06
Challenge	.22	.08	.48	.31	-.07
Competition	.02	-.10	.76	-.08	.10
Social Recognition	.04	.06	.92	-.07	.07
Enjoyment	.21	-.01	.14	.74	-.14
Revitalization	.02	-.00	-.06	.95	.07
Stress Management	.04	-.01	.08	.60	.21
Health Pressures	-.15	-.03	.08	.01	.76
Ill-Health Avoidance	.38	.03	-.04	-.01	.53
Positive Health	.67	.12	-.13	.24	.05
Nimbleness	.70	-.10	.04	.03	.07
Strength/Endurance	.91	-.11	.09	.02	-.14
			Factor correlations		
1. Health/Fitness	-				
2. Weight Management	.55	-			
3. Social Engagement	.52	.15	-		
4. Enjoyment/Revitalization	.64	.35	.56	-	
5. Negative Health	.43	.42	.32	.33	-

Note. $N = 196$. Satorra-Bentler $\chi^2(31) = 56.43$, $p = .004$; Root Mean Square Residual = .02; Comparative Fit Index = .99; Root Mean Square Error of Approximation = .07.